



DEPARTMENT OF TRANSPORT

RAILWAY ACCIDENT

Report on the Collision that occurred on 24th March 1987 at Frome

IN THE
WESTERN REGION
OF BRITISH RAILWAYS

HER MAJESTY'S STATIONERY OFFICE

DEPARTMENT OF TRANSPORT

RAILWAY ACCIDENT

Report on the Collision that occurred on 24th March 1987 at Frome

IN THE
WESTERN REGION
OF BRITISH RAILWAYS

LONDON: HER MAJESTY'S STATIONERY OFFICE

SIR,

I have the honour to report for the information of the Secretary of State, in accordance with the Direction dated 30th March 1987, the result of my Inquiry into the collision between a passenger train and a freight train on 24th March 1987 at Frome North Junction in the Western Region of British Railway.

Shortly after a Yeovil to Cardiff passenger train departed from Frome Station it was struck head-on by a freight train. Fourteen of the 50 passengers on the train were taken to hospital but none of them was seriously injured. The driver of the freight train was seriously injured and it was three hours after the accident before he was released from the wrecked locomotive cab.

The accident occurred at approximately 07.33. The weather was overcast with a light southerly breeze.

DESCRIPTION

The Site and Signalling

1. Frome lies on the line from Westbury to Yeovil and Taunton and the West of England but the double track main line bypasses Frome station. The Up direction of travel is towards Westbury. Approaching Frome from the Yeovil direction the line to the station diverges from the Westbury main lines at Blatchbridge Junction. From there the single bi-directional Down and Up Frome line runs to the station, which has a single platform, and then onto Frome North Junction. At this junction the Radstock freight-only single line converges from the left. On the Radstock line there is a connection to Whatley Quarry. From Frome North Junction there are three tracks, namely, the Up Loop line, Up Frome line and Down Frome line. The Up Frome line, which lies between the other two, is signalled for bi-directional running. The Up Loop line is a freight-only line and can only be entered from the Radstock line. These three lines join into a single connection to the main line at Clink Road Junction. A location diagram of the lines in the Frome area is given at Diagram 1.

2. The Frome area is controlled from Westbury Signal Box and is operated in accordance with the Track Circuit Block Regulations. The signalling was commissioned on the 8 October 1984 and the signals, which are equipped with the Automatic Warning System (A.W.S.), are multiple-aspect colour lights. The interlocking is achieved by electrical relays and there is a remote relay room at Frome. The track and signalling layout is shown on Diagram 2.

3. On the Down Westbury line on the approach to Clink Road Junction is Signal W110. With the route set to either the Down Frome line or the Up Frome line the signal is 'Approach Controlled' and when the signal clears it displays the appropriate junction indicator. Signal W312 on the Down Frome line signals trains onto either the Down and Up Frome line or the Radstock Branch. For a move onto the Down and Up Frome line a main aspect is displayed. For a move onto the Radstock Branch a main aspect with the junction indicator is displayed and is 'Approach Released'. There is a subsidiary route to the Radstock Branch with the red main aspect maintained and a position light and junction indicator displayed. A more restrictive 'Approach Release' applies to this subsidiary route.

The Passenger Train

4. The passenger train was the 06.55 Yeovil Pen Mill to Cardiff train (2B77). It was formed of five Mark I vacuum braked coaches and hauled by locomotive No.33032. The locomotive weighed 76 tonnes and the train 176 tonnes. The total length of the train was 113.8 metres. The train had departed as empty stock from Cardiff Canton Depot at 03.30 and travelled via Westbury to Yeovil.

The Freight Train

5. The freight train (6B03) was the 07.08 from Westbury Yard to Whatley Quarry. It consisted of 30 empty, privately owned hopper wagons. All of the wagons were of the 'P.G.A.', 2-axle type with, when laden, a gross weight of 51 tonnes. Limited to a maximum speed of 60 mile/h., the train was air-braked throughout, 258.3 metres long and weighed 382 tonnes with an effective brake force of 297 tonnes. It was hauled by a 117 tonne Co-Co locomotive No. 47202 with a brake force of 60 tonnes.

EVIDENCE

6. *Mr. R. E. Cruse* was one of the signalmen on duty at Westbury Signal Box and was working at that part of the signal control panel which controls the Frome area. At approximately 07.26 he set the route for the passenger train from Signal W195 over the Up Frome line to Signal W197 and routed the freight train from Clink Road Junction over the Down Frome line as far as Signal W312. When he saw from the track circuit indications that the freight train had cleared the junction he set the route for the passenger train to Signal W199 and then to Signal UW113 on the Up Westbury line.

7. Shortly afterwards he noticed that the track circuit indications for the line beyond Signal W312 were showing occupied and the indications for Nos. 911 and 912 points were flashing but the description for the freight train (6B03) was still displayed in the 'Berth' at Signal W312. He realised from these indications that the freight train had probably passed the signal at Danger. Almost immediately he received from a signal post telephone a call from the guard of the freight train, who told him that the trains had collided and he quickly arranged for the emergency services to attend.

8. *Mr. M. E. Parnell*, a signalling technician employed in the maintenance of the Westbury Area signalling was on duty that morning. He had been employed at this for almost three years having previously been employed in the installation of the signalling equipment. He was alerted to the accident by a telephone call from a colleague who had been travelling on the passenger train.

9. With *Mr. Isbister*, the Signalling Maintenance Assistant, he had gone to the signal box panel and noted the indications displayed. *Mr. Isbister* recorded the information and he checked that what was written down was correct. He told me that the first thing that was obvious to them was that the track circuits in advance of Signals W195 and W312 were showing occupied indicating that the trains had gone past the respective signals. The indicator lamps for Points Nos. 911 and 912 were flashing 'Out-of-correspondence'. The indication for the passenger train (2B77) was displayed at Signal W197 but the indication for the freight train (6B03) still remained at Signal W312. He told me that this indicated to him that the route had been set from Signal W195 to Signal W197 and not from Signal W312.

10. At the site of the accident he examined Points Nos. 911 and 912. He found that the damage to Points No. 911 was consistent with the points having been set for the Down and Up Frome line and having been run through by the freight train in the trailing direction from the Down Frome line. There was no obvious damage to Points No. 912, which were also set for the Down and Up Frome line, and he believed the finely set detection had been lost as a result of the collision.

11. *Mr. S. Isbister* told me that he was the Signalling Maintenance Assistant Engineer directly responsible for the maintenance of the Westbury Area signalling and for the work of *Mr. Parnell* and the other technicians. He confirmed the evidence given by *Mr. Parnell* and outlined the further checks and testing of the equipment that were undertaken.

12. On arrival at the scene of the accident he observed the aspects of Signals W212 and W312 which are located on the same gantry structure. Both signals were showing a red aspect and the position light signals and junction indicators were not illuminated. Then, aided by his staff, he examined the electrical relay interlocking equipment in the relay room at Frome. The position of the relay contacts confirmed that the route forward in the Up direction from Signal W195 was set and no route was set from Signal W312. The relays installed were checked to confirm that they were the types specified in the design. Later an exhaustive check was made to confirm that the wiring connecting the relays was correct, that the busbar voltages were correct and there were no earth faults. Subsequently the accuracy of the timing relays used in the signalling interlocking was checked and found to be satisfactory.

13. The sequence of aspects displayed by Signals DW113 and W110 on the approach to Signal W312 was checked and established as being correct. No faults were found in the cables connecting the signals with the relay room or within the signals themselves. *Mr. Isbister* told me that as a result of the testing he had undertaken he had concluded that all of the signalling equipment was functioning correctly and he concluded that Signal W312 had been passed at Danger.

14. At the controls of the locomotive of the passenger train was *Relief Driver A. D. Noyes* and he was accompanied by Driver *D. R. Masters*. *Mr. Noyes* told me that he had driven the train from Yeovil and that it had been a normal journey until after the departure of the train from Frome Station. He said that as the train entered the station he could see Signal W195 showing a single yellow aspect which was still displayed when the train departed from the station.

15. When the train was close to the signal he noticed the moving 'Stone' train but initially was not certain which line it was on. At first he thought it was possibly on the Up Loop line. He had not applied full power to the locomotive because he knew from the single yellow aspect that the next Signal W197 may have been at Danger and, although the train was accelerating slowly, its speed was between 20 and 25 mile/h. After Signal W195, when the distance between the two trains was about 150m., he realised that the other train was still moving and a collision was inevitable. He shut off power and made a full emergency brake application and rapidly made his way out of the cab and into the engine room compartment. Driver Masters to whom he had shouted a warning, followed him into the engine room.

16. *Mr. S. Gregory*, an Area Trains Inspector, was on duty at Westbury at the time the freight train departed. He told me that he first saw and spoke to Driver Chappell and then saw Guard Richards carrying out a brake continuity test on the train. The Guard, having completed the test correctly, walked towards the locomotive at the front of the train. Mr. Gregory did not see the guard board the locomotive but shortly afterwards he saw the shunter raise his hand and give the 'Right-away' and the train departed.

17. As soon as he learnt of the accident he went by car with another supervisor to the scene of the accident. On arriving there he immediately went to the locomotives. He first went to the rear cab of the freight locomotive, which he entered, and when he saw no movement in the cab checked the engine room and saw no movement there either. A fireman asked him if he had seen the guard and he replied he had not. He said he then descended from that locomotive and went to the passenger locomotive and helped Driver Masters from its rear cab. Mr. Gregory told me that Mr. Masters said "I had a yellow Steve, look at the points". He found the guard of the passenger train helping passengers although he was breathing rather heavily and was shaking. Eventually he found Guard Richards on the platform at Frome station. He had not asked Mr. Richards, who he described as "In a mess, he looked bad", any questions but remained with him until he was taken away to hospital. Sometime later he looked at the lie of the points and concluded the route had been set for the passenger train and not for the freight train.

18. *Mr. G. F. Richards* was the guard of the freight train and he told me that, having booked on duty in the normal way, he walked to the locomotive with Driver Chappell. When the driver had examined the locomotive it was set back onto the train and coupled by the shunter. Mr. Richards then went to the rear of the train to carry out a brake test, which was successful. He then joined the driver in the front cab of the locomotive and the train departed. He looked out from the cab side window and watched the rear of the train out of the yard.

19. He said he then concentrated on making out his 'Daily work sheet'. When he looked up he glimpsed the illuminated junction indicator for Clink Road Junction. He opened the side window and looked back to watch the train through the junction, before closing the window and continuing with his writing. He told me the next thing he could recall was the driver exclaiming "Where are we going". He looked up and saw they were approaching the other train on the same track. He said the driver "Threw all the levers" before leaving his seat. The driver moved to the right hand side of the cab behind him and, urged on by the driver, he also left his seat, crossed the cab, opened the left hand side door and jumped clear.

20. Mr. Richards told me that on landing on the ground he rolled over a few times in case the wagons tipped towards him. He said that having been sick he made his way back up the embankment and telephoned the signalman. He did not know what aspect Signal W312 was showing because he was writing and had not seen it. He assured me that although he had travelled in the front cab he had not been talking to or distracting the driver in anyway.

21. Following the accident *Mr. J. Cameron*, a Traction and Rolling Stock Inspector, carried out an inspection of the braking systems of the trains. He told me that he concentrated on the rolling stock. Starting with the wagons of the freight train he checked to see if the brake pipes were connected, the through air cocks were open and whether the brakes were applied to the wheels. This he checked on both sides of the train. All bar two or three of the wagons had the brakes applied, there were no cocks closed and no sign from the condition of the wheels and the brake pads of an excessive brake application having been made. Too long a period of time, almost two hours, had elapsed between the accident and his inspection for the temperature of the wheels and brakes to indicate the severity of the brake application.

22. Mr. Cameron also examined the coaches of the passenger train but not before the two locomotives had been pulled apart. The passenger train had been pulled backwards from the point of collision. The leading coach was disconnected from the Vacuum brake system but the brake was operational on the rear four coaches. The vacuum cylinders were in the applied position, and the vacuum was holding, so he assumed the brake had been in order but he did not check it.

23. *Mr. B. J. Penny*, the Assistant Locomotive Engineer for the Western Region, told me that he arrived at the site at about 09.55 by which time the passenger train had been moved back to assist in the work of rescuing Driver Chappell from the cab of locomotive No. 47202. The trailing wheels of the leading bogie of locomotive No. 33032 were derailed and the bogie was displaced from its king pin. The leading cab, the No. 2 end cab, was badly damaged having been crushed back to the engine room bulkhead. The leading bogie of the first coach was also derailed.

24. He was unable to gain access to the leading cab of locomotive No. 47202 so he went into the trailing, the No. 2, cab. He noted that the controls were in the normal position for the trailing cab. That is, the forward/reverse handle was in the locked position and the change end switch, which energises the cab, was in the off position and the A.W.S. was not isolated. All of the brake gauges were reading zero. He then made an examination of the external brake equipment. All of the brake blocks, which were about half worn, were off the wheels. He said there was no sign of excessive braking. He told me that he found none of the brake block faces showed any signs of 'blueing' to be found after severe braking even from relatively slow speeds.

25. He gained entry to the leading, the No. 1, cab, which was extensively damaged and crushed back to the engine room bulkhead, through the engine room of the locomotive. The control desk switch key was inserted and the change-end switch was in the on position. The A.W.S. was not isolated and the visual indicator was showing an all black display. He explained that this was the display for the previous signal showing a green aspect but the indicator could change the display if subjected to a blow. The forward/reverse handle was in the forward position, the power control handle was fully open, and the driver's brake valve was in the emergency position. Mr. Penny said that the controls were, apart from the power control, as he expected for the locomotive being driven from that end. The position of the controller he believed could be explained because it is free to move when the control desk key is unlocked and will move with little pressure. It could easily have been moved during the work of releasing the driver. He told me that he had found the locomotive's brake selector switch was in the vacuum passenger position.

26. I asked Mr. Penny if he had been able to deduce how the locomotive was being driven at the time of impact. He said that it was difficult to say because all the air had been lost from the locomotive's brake system but the fact that the brake handle was in the emergency position indicated the driver had made an emergency application. He could not, however, estimate for how long the brake application had been made. He estimated from the damage caused to the locomotives the combined impact speed was not more than 20 mile/h.

27. *Mr. M. A. Winstock*, the Freight Engineer for the Regional Mechanical and Electrical Engineer, was responsible for initiating a series of more detailed tests on the locomotives and rolling stock. He was also a member of the Railways' own inquiry panel. I asked him to summarise the conclusions he had reached from the tests and the evidence he had heard.

28. He said that the cab of locomotive No. 33032 was so severely damaged that it had not been practicable to test the brakes of that locomotive. The passenger coaches were subject to a functional test on site following the collision. From these tests he was satisfied that the brakes of the passenger coaches were operating properly.

29. The freight train locomotive No. 47202 was towed to the Westbury depot and a series of tests were performed on all aspects of the braking of the locomotive. The damage to the leading, the No. 1, cab of the locomotive prevented the brake tests from being undertaken from the locomotive. The equipment was removed and installed on a separate test rig where it was subjected to the same tests that would have been performed if the equipment had remained on the locomotive. He said that after all of the tests involving many different pressures and timings he was satisfied that there was no fault in the braking system of the locomotive.

30. Those wagons, which were not so severely damaged as to make tests impractical, were tested. Nineteen wagons at the rear of the train were taken to Westbury Yard shortly after the collision and with another locomotive coupled to them were given a brake continuity test and brake cylinder pressures were measured on every wagon. Three more wagons were repaired and then subjected to a similar test. The remaining wagons were too badly damaged to be tested. Mr. Winstock said that the tests indicated to him that there was no braking deficiency on the wagons of the freight train.

31. He explained that he would have expected the locomotive's brake selector switch to be in the air-goods position because that was the type of train being worked. The air brake system of the train would still work effectively with the locomotive brake selector in the vacuum position but the application timing would be slightly different. He told me that he had arranged for a computer simulation of the 30 wagon

freight train with the brake selector in the found position for speeds from 5 to 50 mile/h. For speeds of 10, 15 and 20 mile/h. on a falling gradient of 1 in 138 the calculated stopping distances were 36, 71 and 115 yards respectively.

32. It was some months after the accident before *Driver E. Chappell* was sufficiently recovered from his injuries for me to be able to speak with him. He had only a very limited memory of the events leading up to the accident and no recollection at all of the approach to Signal W312. He could recall that Signal W110 was displaying the 'Feather' junction indicator. He thought he was alerted to the train taking the wrong line by a shout from Guard Richards. He remembered making a full emergency brake application and attempting to get out of the cab but being unable to open the door.

33. Mr. Chappell told me that he accepted from the other evidence, which had been explained to him, that he must have driven the train past Signal W312 at Danger. He had, however, no recollection of doing so and had been unable to find an explanation for having done so. He confirmed that at the time his health was good and he knew of nothing that would have impaired his driving ability.

CONCLUSION

34. From the evidence of the signalman and the drivers of the passenger train the route had been set and Signal W195 had been cleared for the passage of that train. The lay of the points following the accident confirmed that the route had been set for the passenger train and not for the freight train. The exhaustive tests of the signalling equipment following the accident established that there was no fault in the equipment and with Signal W195 cleared it was not possible for Signal W312 to have been cleared, for the subsidiary signal either with or without the junction indicator to have been illuminated, or for any of the signals on the approach to Signal W312 to have been showing a false aspect.

35. The examination of the freight train after the accident did not find any fault that would have prevented the train from being properly controlled and stopped at Signal W312. Also there was no evidence of a severe or prolonged brake application. I conclude, therefore, that the accident was caused solely by the failure of Driver Chappell to stop the freight train at Signal W312, which was passed at Danger.

REMARKS AND RECOMMENDATIONS

36. Although I have no specific recommendations to make there are a number of aspects of this accident which I consider to be worthy of comment. Guard Richards' presence in the leading cab was irregular. The guard travelling on the locomotive of a freight train should, according to the British Railways Board's Rules and Regulations, travel in the trailing cab of the locomotive. I can not condone the breach of the Rules by Mr. Richards but it is not unusual, however, for guards to travel in the leading cab and there may be advantages in them doing so. Should the Rules be modified to allow them to do so then I consider that when they do so they should always pay attention to the aspects signals are displaying.

37. It is very much to Driver Chappell's credit that he accepted that it was his error that was the cause of the accident. On three previous occasions he had driven mainline trains past signals at Danger. They occurred in January 1975, October 1980 and December 1984. Without making any judgements on these previous incidents it is clear that Mr. Chappell's record should have alerted management to a possible problem. Unfortunately the information available to his immediate manager was not complete. The reasons for this have been identified and appropriate action taken. Obviously, it is important that each driver and incident is judged on the individual circumstances but a consistent managerial approach is essential to ensure drivers who may be experiencing difficulties are identified. Attempting to identify why some drivers pass signals at Danger is being actively studied by the British Railways Board. It is hoped that from this work it will be possible to identify more accurately the personal aptitudes that should be looked for in selecting drivers.

38. Accidents of this type caused by driver error could be prevented by the provision of an Automatic Train Protection system, which will apply the brakes of the train should a train be driven incorrectly towards and past a signal at Danger. The financial investment required to introduce such a system throughout the railway network is vast. The track layout and signalling arrangements at Frome North Junction were to the current British Railway Board's standards.

39. Finally, this relatively slow speed collision has once more illustrated the structural weakness and lack of protection afforded to staff by the majority of existing locomotive cabs. It was due to the alertness of Driver Noyes that the consequences of the collision were not more serious than they were. My fellow

Inspecting Officers and I have previously commented in our Reports on other accidents on this aspect. The British Railways Board are aware of this problem and new locomotives are constructed with stronger driving cabs. The need to do so and to find ways of improving or eliminating locomotives with unsatisfactory cabs has been further emphasized by this accident.

I have the honour to be,

Sir,

Your obedient Servant

A. COOKSEY
Inspecting Officer of Railways

The Permanent Under Secretary of State
Department of Transport.

COLLISION AT FROME ON 24th MARCH 1987

